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# The moderating effect of cost of capital on working capital management and firm's performance in Nigeria

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**Abstract**
The direct effect of working capital management and its components (accounts receivable period, accounts payable period and inventory holding period on firm's performance has been examined in the previous literature, which discovered that there is a severe dearth of literature on WCM and firm's performance especially in Nigeria. The underlying components that influence the performance have not been comprehensively explored in Nigeria. Therefore, the main objectives is to examine the effect of working capital management and its components on firm's performance. Another objective, this study introduced cost of capital as a moderating variable to investigate the moderating (interaction) effects on the relationship between each component of the WCM and firm performance. To achieve these objectives, the study obtained panel data of 75 listed firms on the Nigerian Stock Exchange, the data for the Study is based on the annual financial reports of 145 firms derive from the quoted companies on the Nigerian Stock Exchange for the period between 2011 to 2020. These objectives were met by the use of a panel data methodology on a series of interactive models. Furthermore, the study test the fixed-effect model and random effect model. Finally, the study has implications on both theoretical and managerial perspectives.

**Keywords:** Working capital management, cost of capital, firm performance, panel data analysis

## 1. Introduction
A firm's performance is one of the most critical areas in academia and industries around the world. Usually, financial managers have to make a crucial financial decision to determine the company's value. However, firm performance measures companies' earnings, profits, and appreciation in share value arising from efficient and effective positioning of the organization's resources (Peter & Nelson, 2020) [43]. Firm performance is one of the driving forces of growth and development of any economic activities in the world. This is because it can increase return on assets, return on equity to shareholders, and guarantee salaries and wages for workforces.

Customers view performance as ensuring better and higher quality product delivery which the general public would benefits through a conducive environment and corporate social responsibility improvement. Similarly, increased in performance is synonymous to increases in government revenue through taxation, which contributes to the nation state's gross domestic product (GDP) (Udoffia & Akpanah, 2016; Cosmas & Mourad, 2019) [56, 15]. Many scholars argued that the worst economic disaster had been the low level of its performance on the African continent. (Mensah & Quarcoo, 2019; Sunde, 2017 & Abubakar & Aina, 2019) [37, 52, 2].

One common challenge facing these countries is the constrained market size and limited access to capital. According to Abiodun (2016) [61], most countries in Africa are faced with challenges, ranging from shallow financial capacity and debt to deficient liquidity levels, this reflected in the number of countries with stock markets in Africa. From the numbers of about 57% African countries, only 23% countries have stock markets. Only a few were active such as (Ghana, Egypt, Morocco, South Africa, and Kenya); others are moving at the elementary level. By implication, the stockholders and other industrialists in the African continent with great business ideas might not have access to available capital.

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These challenges led to the formation of the London Stock Exchange (LSE) Advisory Group for African Countries to manage and control the low liquidity, low financial capacity, and performance problems affecting African businesses (Abiodun *et al*., 2016) [61]. Undeniably, current surveys across Africa have shown that a gap in financing and government support has led to the indecisive development of economic activities (Jaiyesimi, 2016) [23]. Other challenging problems may consist of social challenges, country risks – including kidnapping, arm-banditry, Boko-Haram, legal and regulatory risks, infrastructure deficit, and currency risks (Nnam & Akwara, 2020) [39], and Nigeria is facing such difficulties and challenging presently.

Nigeria is one of the world's biggest economies and a giant of Africa, has also been subjected to slow growth in performance, which has brought many companies' unpredictable failure. The growth of a firm's performance in Nigeria has been an issue for an extended period. They have grossly underachieved compared with other countries globally, such as China, Indonesia, Brazil, Singapore, Malaysia and Thailand (Ardi & Murwaningsari, 2018) [11]. This is because the enormous natural and human resources which Nigeria has been endowed have not been fully utilized effectively and efficiently to improve the firm performance (Abubakar & Haruna, 2018; Ardi *et al*. 2018; Adeyemi & Oyeniyi, 2017) [1, 11, 4].

Decreasing in firm performance in Nigeria has not been a significant influence over the benefits that accrue from high performance (Eya, 2016; and Khalid, 2018) [18, 27] amongst others stated that the proportion of the exceptional relative decreased in performance of a company is best described by the influence of corporative costs arising from a liquidity squeeze and the consequent tightening of credits by the various financial institutions.

## 2. Literature review
.The relationship between WCM and firm performance has been studied in different contexts by previous researchers. For instance, Deloof (2003) [16], Lazaridis and Tryfonidis (2006) [30], Tauringana and Afrifa (2013) [53], Almazari (2013) [63], Arshad and Gondal (2013) [64], Tufail, Bilal and Khan (2013) [71], and Korankye and Adarquah (2013) [65] found a significant and negative relationship between WCM variables and profitability. Deloof (2003) [16] used 1,009 Belgian non-financial firms between 1992 and 1996 to determine the relationship between WCM and corporate profitability. Deloof (2003) [16] found a negative and significant relationship between gross operating income of Belgian firms and working capital measures. The results also indicated that the manner in which working capital is managed would determine its impacts on firm profitability. Lazaridis and Tryfonidis (2006) [29] examined the relationship between WCM and the profitability of 131 firms listed on the Athens Stock Exchange between 2001 and 2004.

Murthy and Sree (2015) [38] define firms' profitability as the ability to take an advantage on operational and investment decisions and strategies to achieve a business' financial stability. According to Adebayo (2016) [3], a firm's profitability comprises achievement measurements of an organization. Thus, a firm's profitability measures an organization's benchmarks and financial objectives. In literature, a wide range of measures are used in measuring a firm's financial performance including profitability measures, liquidity measures and debt measures. Bradley and Moles (2002) [67] show that the ultimate goal of any organization is profit maximization; therefore, profitability measures are widely used as compared to other measures.

## 2.1 Accounts receivable period (ARP)
This ARP is the average number of days that a company could receive payment from the customers arising from credit sales. ARP's main reason is to manage the period between credit sales given to customers and when the payment is received. This ARP affects the firm's decisions on credit policy due to the nature of the business environment's competition, which compelled firms to offer credit sales to customers (Siraj and Sarwat, 2019) [51]. Since the goal or objective for complying with credit sales is to expand sales, this could lead to loss from bad debt. A firm policy of credit sales may decrease the possibility of bad debt, which decrease in sales may occur (Wasiuzzaman & Arumugam, 2013) [59].

Amponsah-Kwatiah *et al*. (2020) [10] & Samilogiu and Akgun (2016) [46], found a positive relationship between ARP and profitability. While several researches studies had reported a negative association between ARP and profitability, (See. El- Maude *et al*., 2016) [17]; Lampty *et al*. (2017) [28], Tahir and Anuar (2016) [62], Pirttilä *et al*. (2019) [44], and Tran *et al*. (2017) [54]. The negative association between ARP and firm performance was interpreted that the longer the number of days the firm takes to receive debtor's sales outstanding the lower the profitability Usman *et al*. (2017) [57]. Stated that the negative association would be done when a customer embarks on the assessment of product quality bought from the company; as such, the profit would be decreased. Therefore, decreasing the ARP would increase the company's performance. Furthermore, Daniel and Ambrose (2013) [72], who evaluated ten firms between 2003 to 2012, made empirical studies in Kenya and Mathuva (2013) [73], who studied 30 companies between 1993 to 2008, confirmed a negative relationship between the average collection period and the profitability of companies. While Daniel *et al*. (2013) [74] found an insignificant relationship and Mathuva (2013) [73] found a significant and negative relationship.

Daniel *et al*. (2013) [74] found an insignificant relationship because their sample comprised construction companies, and construction companies always receive an advance before work commences. Mathuva (2010) [35] suggested that profitability could be enhanced if a firm reduced the period for which receivables were outstanding or developed a policy encouraging customers to pay bills on time.

Ademola (2014) [66] found a significant and negative relationship between working capital management and 12 Nigerian food and beverage-manufacturing firms' profitability between 2002 and 2011. The study confirmed that firms in Nigeria have difficulty assessing financing conditions and creditworthiness. As a result, some firms kept customer loyalty by extending the payment period, which ultimately might lead to bad debt if not adequately taken care of. Ademola (2014) [66] recommended that Nigeria's food and beverage firms speed up collection periods to enhance their profitability. Aileman and Folashade (2014) [8] evaluated the relationship between WCM and the profitability of Nestle and Cadbury Nigeria Plc from 2008 to 2012. They found a negative but

insignificant relationship between accounts receivable and the profitability of Nestle Nigeria Plc.

## 2.2 Accounts payable period (APP)

The APP explained the average number of days that a firm is anticipating to pay suppliers their debt whose invoices are already processed but yet to make payment. Most prominent and small companies usually regard the amounts of money outstanding to trade creditors as a means of short-term credit free. The higher the APP amount, the higher its total amount of cash on its activities (Maeenuddin *et al*., 2020) [31]. The trade-credit period gives rise to a decrease in transaction costs, therefore improving the company's performance as stated by (Vartak *et al*., 2019) [58] that the APP can improve the company's performance regarding using money to manage financial problems. Garcia-Teruel and Martinez-Solano (2007) [20] argued that the APP is another form of short-term financing; firms use it to finance a certain proportion of their current assets.

Accordingly, as the size of the firm increases, it helps to bring higher performance in APP. As stated earlier by Lampty *et al*. (2017) [28] that small companies usually depend on trade credits. Mahato and Jagannathan found a positive relationship between APP and profitability (2016), Amponsah-Kwatiah *et al*. (2020) [10], Khalid *et al*. (2018) [27], Boisjoly *et al*. (2020) [13] and Filbeck, *et al*. (2016) [19]. In contrast, studies of Geo and wang (2017) [21] reported the negative association between APP and profitability (2007); Kabuye *et al*. (2019) [25]; Vartak *et al*. (2019) [58] and Kayani *et al*. (2019) [26]. The negative relationship between APP and firm performance is that the longer the firm's period to pay its suppliers, the shorter the profitability and that the company would reduce profitability the longer days before the company pays bills to creditors (Deloof, 2003) [16].

Whereas for the positive relationship, the longer the company stays to pay trade creditors, the higher the amount of cash flow readily available to use to improve the company's performance to make a profit. Lampty *et al*. (2017) [28]. According to Jensen and Meckling (1976) [24] and Akinlo (2012) [69], the importance of maintaining the Components of working capital management is because of the imperfect world in which we live in. This is characterized by transaction costs and the costs of scheduling production (Bruinshoofd & Kool, 2004) [14], and the costs of production can vary due to high borrowing and lending rates. Hence, Martinez-Solano *et al*. (2013) [75] said that an optimal policy would allow firms to enhance their values in a situation in which market imperfection exists.

Given the intense nature of today's business climate and competition arising from the global market and high costs of input, most firms are under pressure to achieve more with less cash. This is because, a company need to build a competitive advantage strategy. Accounts payable management has been identified as a means of enhancing profitability through cost reduction (Ikechukwu & Nwakaego, 2015) [22]. This is evident in Bhattacharya's (2008) trade credit literature, which associates higher payables with higher profitability.

## 2.3 Inventory Holding Period (IHP)

This IHP represents the total amount of stock held by the company over some time. IHP is the period under which a firm changes raw materials into finished goods readily available for sale. Inventories comprise work in progress, finished goods, and raw materials (Simon *et al*., 2019) [49] describes inventory as the standard largest manufacturing company's common most considerable assets. The inventory holding period is explained as a period that takes a company to convert its inventory into sales. The main reason for managing inventory is reducing inventory holding costs without interruption in the production processes (Lampty *et al*., 2017) [28]. The management must maintain an optimum inventory or stock to satisfy customers' demand to prevent unnecessary inventory holding period costs (Afrifa *et al*., 2013) [5].

Efficient management inventory ensures adequate inventories for possible operations while ordering and carrying costs are put to the possible minimum amount (Brigham & Daves, 2004) [68]. IHP assists a manager in controlling the risk of 'stock-outs' and periodic sales, which help to improve customer demand and decrease ordering carrying costs. The research studies of Singh, Kumar, and Colombage (2017) [50]; Mahato *et al*. (2016) [32]; Vartak *et al*. (2019) [58]; (Lampty *et al*., (2017) [28] and Samiloglu *et al*. (2016) [46] found a negative relationship between IHP and profitability. But, the studies by Simon *et al*. (2019); Amponsah-Kwatiah *et al*. (2020) [10]; Zeidan *et al*. (2017) [60]; and. Usman *et al*. (2017) [57] found a positive relationship between IHP and profitability. The negative coefficient shows that a reduction in the number of days that takes a firm to dispose of inventories decreases profitability Lampty *et al*. (2017) [28].

Several studies have recognized that efficient and effective inventory management is essential in driving a firm's performance (Bin Syed & Suhaimi, 2016 [12] and Al Dalayeen, 2017) [9] Tsagem and Ishak (2015) [55] emphasized that the traditional inventory problem stems from how assets of inputs of all kinds are managed. El-Maude *et al*. (2016) [17] added that either too large or too small quantities constitute a great danger to a firm and may cause it to fail in the long run. They reiterated that not managing inventory effectively and efficiently exposes a firm to the risk of production bottlenecks, which hinder the required minimum level that drives profits. Having too small of an inventory has the effect of reducing sales through lost marketing patronage.

## 3. Research methodology

The study used quantitative data extracted from annual financial reports of nonfinancial companies in Nigeria. The data was collected from the Nigeria Stock Exchange Commission (NSEC) it serving as a Centre for regulations and corporate information, and development of Nigerian companies. The data contained financial information of 145 companies and the number of unbalanced panel data observations is 750 in this study over the period of ten years from 2011 to 2020. In order to arrive at the sample size, the financial statements of the companies are examined to eliminate firms with negative values in their current assets and current liabilities components. The period of this study was chosen in line with the argument by (Wasiuzzaman & Arumugam 2013) [59] who argued that the WCM of Nigeria become worsen from the year 2009. The final sample is 75 is in consistent with oyeyinka, *et al*, 1996) [40]. Suggested that Nigerian have seen improved due to the intervention of the Nigerian government in order to make the market more reliable and accessible for the stakeholders of the firms.

## The research model

$TQit=βo+β1ARPit+β2APPit+β3IHPit+β4WACCit+β5ARPit*WACCit+β6APPit*WACCit+β7IHPit*WACit+εit$

## Where

TQ = Tobin's Q
ARP = Accounts Receivable Period
APP = Accounts Payable Period
IHP = Inventory Holding Period
WACC = Weighted Average Cost of Capital
$ε_{it}$ = Error term.

## 4. Results analysis

**Table 1:** Descriptive

| Variables | Obs | Min | Max | Mean | Std. Dev. |
|---|---|---|---|---|---|
| Tobin's Q | 750 | -31.3 | 16.89 | -1.4487 | 1.3302 |
| ARP | 750 | 14.21 | 107.0 | 137.40 | 286.18 |
| APP | 750 | 14.12 | 130.0 | 529.31 | 3568.83 |
| IHP | 750 | 29.50 | 401.0 | 133.49 | 213.44 |
| WACC | 750 | 37.03 | 395.0 | 60.804 | 3.4618 |

**Source**: Author's Analysis (2022)

The above results shows that the dependent variable Tobin's Q which measured performance of the company has a means value of -1.4487 percent. This means that the number of companies experienced net loss during the period, this reflect that the companies do not efficiently transform their assets into revenue. Furthermore, the result also shows the statistics of the independent variables. The period of time ARP to collect cash from the customers from the credit sales would takes an average of 137 days while the minimum and maximum days are 14 days and 107 days respectively. In the same way, a company takes an average of 529 days to settle suppliers (APP) and delays for a minimum of 14 and maximum of 130 days.

The variation in ARP and APP discloses that the company could have a cash flow for the running of their day-to day business activities. This is because, the numbers of days in paying suppliers is greater than the collection period of sales outstanding. The mean for IHP is 133 days and minimum of 30 and maximum of 401. This implies that the company has a minimum of 30 days to change their inventory into revenues. The WACC used as a moderator to measure the efficiency of the company in WCM has a mean of 4 days and the minimum and maximum days are 37 and 395 days. This explains that a company takes an average of 61 days to source for funds for the purpose of WCM.

**Table 2:** Correlation

| Variables | Tobin's Q | ARP | APP | IHP | WACC |
|---|---|---|---|---|---|
| Tobin's Q | 1.000 | | | | |
| ARP | -0.005 | 1.000 | | | |
| APP | -0.009 | 0.012 | 1.000 | | |
| IHP | -0.021 | 0.007 | -0.001 | 1.000 | |
| WACC | -0.038 | -0.018 | -0.035 | 0.007 | 1.000 |

**Source**: Author's Analysis (2022)

The correlation analysis is used as a techniques or tools to determine the level of relationship between each variable that was tested. The correlation of ± 1 is indicates perfect positive or negative relationship. It started from zero which shows no relationship between the two variables. From the Table Tobin's Q has negative relationship with ARP, APP,

IHP, WACC, the table, discloses that the minimum and maximum positive correlations among the variables are 0.0347 and 0.2481 respectively. While the minimum and maximum negative correlation among the variables are -0.005 and 0.007 According to Pallant (2007) [70] multicollinearity occurs in a data when correlation value is 0.9 and above. Therefore, it is based on this statement that a researcher believed that there is no multicollinearity on this data.

**Table 3:** Regression Analysis for the Independent variables on T, Q

| Variable | Coefficient | Std. Error | t-Statistics | Prob. |
|---|---|---|---|---|
| C | 1.2705 | 1.7089 | 0.74 | 0.457 |
| ARP | 1.9967 | 0.9676 | 2.06 | 0.039 |
| APP | -2.320 | 0.9829 | -2.36 | 0.018 |
| IHP | 0.0971 | 0.0270 | 3.60 | 0.000 |
| WACC | 2.3200 | 5.9800 | 0.39 | 0.698 |
| R-Squared | 0.1055 | | | |
| Adjusted R-squared | 0.0970 | | | |
| Wald chi$^2$ (6) | 23.96 | | | |
| Prob (F-statistics) | 0.0005 | | | |
| NO. Obs | 750 | | | |

**Source**: Author's Analysis (2022)

Table above discloses that ARP, APP, IHP, are significant with the model. This signifies that there is an association between the independent variables and the dependent variable in the model. The $R^2$ value for the model is 0.1055 which means that the model consisting of the independent variables which explains almost 11 percent of the variation in the model. According to Falk and Mill (1992) recommends that $R^2$ values should be equal to or greater than 0.10. Therefore, the $R^2$ on this study is within the boundary. Furthermore, the Table 4.5 discloses that ARP, APP IHP, and firm size are found to be significant to Tobin's Q and WACC on the other hands are found to be insignificant to Tobin's Q.

The weighted average cost of capital has insignificant relationship with the firm's performance. Therefore, based on these variables, there is only one variables that is, APP that have negative relationship with Tobin's Q, while the remaining independent variables have positive relationship with Tobin's Q. The negative coefficient means that when APP decreases, the firm's performance of the company would increase. This is inconsistent with the work of (Afrifa, *et al*., 2016, padachi, 2006; serrasquiro and Nunes, 2008) [6, 41, 47].

**Table 4:** Models of Moderating Relationship with Weighted Average Cost of Capital

| Variables | Tobin's Q Model | | |
|---|---|---|---|
| | Coef. | t-stat. | p. value |
| C | 8.15836 | 3.2477 | 0.000 |
| ARP | 0.01659 | 0.00075 | 0.015 |
| APP | -0.01471 | 0.00478 | 0.031 |
| IHP | 0.0187 | 0.0064 | 0.026 |
| WACC | 0.247 | 0.0292 | 0.025 |
| ARP*WACC | -0.00021 | 0.00001 | 0.015 |
| APP*WACC | 0.00012 | 0.00003 | 0.017 |
| IHP*WACC | -0.00013 | 0.00004 | 0.041 |
| F-Statistics | 31,354 | | |
| R-Squared | 0.3575 | | |

**Source**: Author's Analysis (2022)

From the table, the WACC was significantly moderate the

relationship between ARP and TOBIN'S Q as presented in table above, shows a coefficient of -0.000021. The coefficient indicates a negative relationship and suggests that the shorter the ARP*WACC, the higher the TOBIN'S Q and vice versa. This means that a decrease in ARP*WACC by one day is associated with a 0.00001 increase in TOBIN'S Q. The relationship between ARP*WACC and TOBIN'S Q was statistically significant at 5% because the p-value (0.015) was less than 10%. Furthermore, the result reveals that during inflationary periods, customers are reluctant to pay their bills because such increases in price adversely affect their cost of living. Therefore, this study argues that such unwillingness to pay debt creates a gap in the finances of firms and consequently adversely affects their performances.

The regression result predicted that WACC was significantly moderate the relationship between APP and TOBIN'S Q, revealed a coefficient of 0.000012. This indicates a positive relationship between APP*WACC and TOBIN'S Q and suggests that an increase in APP*WACC similarly increases TOBIN'S Q. Thus, an increase in APP*WACC by one day is associated with a 0.00003 increase in TOBIN'S Q. The relationship was found to be statistically significant at 1% as the p-value (0.017) was less than 10%. However, One plausible explanation that the coefficient of the moderation result revealed that, while firms face the consequences of price level changes, they, in turn, extend payment periods to their customers. Delaying payment periods, the more creating the gap in financing operational activities and it's also consistent with assumption that holders of monetary liabilities gain during price level changes.

The findings of this study show that the relationship between IHP*WACC and TOBIN'S Q was negative and statistically significant. This is because the coefficient was -0.000013 and statistically significant at 5% ($p>0.041$) level. The result suggests that an increase/decrease in IHP*WACC period leads to a decrease/increase in TOBIN'S Q. Thus, an increase in IHP*WACC by one day will decrease TOBIN'S Q by 0.00004. This finding suggests that firms always need to adjust their inventory policy to reflect the effect of price level changes to improve their market performance.

## 5. Conclusions and recommendations
This paper attempted to examine the effect of cost of capital on WCM and firm's performance of nonfinancial listed firms in Nigeria. In order to achieve the objectives of the study, a panel methodology was employed within an explanatory research design. In analyzing the data obtained, the paper started with the descriptive statistics of the variables. Correlation analysis was also conducted which showed that there were positive and negative relationships between explanatory variable Tobin's Q as proxied for firm's performance. In the quest for clear examination of the effects of explanatory variables on profitability indicators, correlation analysis alone was not enough. Therefore, the static panel regression analysis was estimated. The post estimation tests conducted indicated that the estimates are fit to be interpreted and be used to recommend policies. From the fixed and random effects results based on the Hausman test, the study found a strong positive and significant relationship between inventory holding period, account receivables period and account payables period and Tobin's Q. However, the overall findings however indicate that the explanatory variables influence Tobin's Q positively in the nonfinancial sector of Nigeria.

Dependent variable: The DV for this study is firm's performance. So, has been the case with many studies investigating the impact of WCM. Few studies made „profitability" as the dependent variable, for instance Padachi (2006) [41]. However, even where that was done, the profitability was mostly measured by the performance in terms of financial aspect. In view of this, future research should look at working capital management beyond financial performance or profitability. Accordingly, future research should investigate other financial performance measures of working capital management such as earnings per share, operating cash flow, return on sale, labor productivity and return on revenues.

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