# Working Capital Management and Financial Performance: Evidence from Listed Healthcare Companies in Lagos, Nigeria

**[1]Faiza Haruna Maitala (Ph.D), [2]Nasamu Gambo, [3]Umar Abbas Ibrahim, [4]Ojo Adebola Abisoye**

[1,2,3,4]Department of Business Administration, Nile University of Nigeria, FCT, Abuja, Nigeria
[4]Newgate University Minna, Niger State

**Abstract:** *Promising investments with a high rate of return and companies failed in distress due to insufficient working capital and this has led to employees being laid off from work which has increased the rate of unemployment in Nigeria. Therefore, this study seeks to understand the effect working capital management has on the financial performance of listed healthcare firms in Lagos, Nigeria. The study adopted the ex-post facto research through the use of published financial statements of the 10 listed companies. The sample of the study is 100 data points and were analysed using Vector Error Correction Model to determine the effect of working capital management on financial performance. The study revealed a negative and significant relationship between working capital management and financial performance based on the selected proxies. Therefore, the study recommended that financial managers of the listed companies should reduce the working capital to improve their financial performance.*
**Keywords:** working capital management, financial performance, healthcare companies, Lagos, Nigeria
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## INTRODUCTIION

With much managerial and academic interest, working capital management has become an essential financial component for enterprises and companies (Chiang, et al. 2019). To achieve effective and efficient levels of working capital, companies focus on cash inflows and outflows. Working capital management is related to financial management to maintain business enterprise management (Kumari & Anthuvan, 2017). This means that working capital management determines the degree of business interest, whether or not it is properly managed. Ineffective management of working capital results leads to lower expected rates of return on

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capital employed and great losses. To be successful in your business, you need to use working capital efficiently. Working capital is generally considered as current assets minus current liabilities. This is part of the funding considerations, capital structure, and investment budget (Ross, et al. 2014).

Working capital management maintains the company financially between periods in which the goods were sold and the returns expected from its customers and the verification of cash flows (Simon, et al. 2018) and this has supported and enhanced the companies' financial performance (Afrifa & Padachi, 2016; Makori & Jagongo, 2013). Working capital management is an essential aspect of corporate finance as it directly impacts the liquidity and productivity of the organization. It is essential for many reasons. Certainly, high levels of working capital can lead to an unsatisfactory return on investment. However, enterprises with fewer working capital may face gaps and problems in keeping operations running smoothly (Wasiuzzaman, 2015). Successful working capital management involves planning and controlling working capital in such a way that it removes the risk of non-fulfilment of short-term liabilities due on the one hand and avoids unnecessary benefits on working capital elsewhere (Eljelly, 2004). Thus, properly managed working capital will increase the cashflow which will finance the internal operations in the organizations until the cashflows are realised (Nzioki, et al. 2013).

Several researchers have shown that maintaining an ideal degree of working capital components promote financial performance and thus increases shareholder wealth (Sensini, 2020). Otherwise, the lack of effective management of the components of working capital can cause a crisis in profitability and liquidity, which will affect business operations and their continuity (Ukaegbu, 2014). In light of this studies, working capital management can be summarized from two different perspectives.

First, some researchers have found that higher investment in working capital has a positive impact on profitability, by identifying specific benefits (increased sales, improved customer relationship, reduced supply costs and reduced information asymmetries, among others) associated with business capital growth (Singh & Kumari, 2017; Vukovic & Jakic, 2018; Lefebvre 2020). Second, several studies have identified negative relationships and their impact on profitability and liquidity, and have identified some flaws (poor inventory planning, over-financing, increased financing expenditures, withholding of funds in working capital, among others) that can damage the business. (Campos, et al. 2014; Nguyen, et al. 2020), which leads to greater financial difficulties and potential bankruptcy (Nguyen, et al. 2020).

According to these two viewpoints, determining and maintaining optimum levels of working capital is anything but a simple assignment because the level of working capital must also take into account the characteristics of organizations, industries and economic variables. Moreover, working capital management strategies and policies are of critical importance for any business, especially for organizations in developing countries that are characterized by limited access to the capital market and heavy reliance on the banking system and other financial institutions (Nastiti, et al. 2019). Therefore, these indicate that operational and financial constraints can lead organizations not to seek the optimum level of working capital and thus affect their financial operations (Sensini, 2020).

In this regard, this study examined the effect of working capital management on the financial performance of listed healthcare organizations listed in Lagos, Nigeria. Healthcare companies are companies that provide medical services such as manufacturing, marketing, distribution, pharmaceutical services, and other health services. In Lagos, Nigeria, there are ten (10) healthcare companies that are listed on the Nigerian Stock Exchange (NSE), which were reviewed.

## REVIEW OF LITERATURE

### Working Capital Management

The term working capital is the difference between current assets and current liabilities. It is also part of the current assets that are funded with long-term funds. Napompech (2012) identified working capital as the company's net assets. Working capital management also refers to financing, investment and net current control over assets through various corporate policies (Padachi, et al. 2012). Several proxies have been used to measure working capital management such as accounts payable period (Hyz, et al., 2018), days receivables (Prempeh, 2018; Hassan & Shrivastava, 2018), inventory conversion period (Prempeh 2018; Ulah, et al., 2018), cash conversion cycle (Nastiti, et al. 2019), net working capital (Korent & Orsags, 2018) among others. Hence this section discussed the measures and proxies that are significant to this study and are used in other to estimate working capital management which are the inventory conversion cycle, accounts payable period and account receivable period.

### Average Collection Period

Many allow customers to take ownership of their products with the intent to pay later, this is expected within 30 days. These receipts are accounts receivable because the company expects these payments in its account. Accounts receivable is one of the assets owned or earned. According to Gill et al., (2012), the average collection period is the expected days required to collect pending amounts from customers. This procedure is used to determine the effectiveness and efficiency of a company's credit policies and to attempt to collect them. Accounts receivable are assets that show the money due to a company's sale of goods or services in the context of daily business. Account Receivable Period is calculated as: Account Receivables/Net Sales× 365.

### Inventory Conversion Period

Inventory represent items purchased for resale to certain benefits. The previous literatures confirms that, under ideal market conditions, companies tend to obtain accurate and useful information about demand conditions, and therefore companies tend to maintain fewer investments in inventory, but under incomplete market conditions, companies are forced to maintain massive investments in stocks for protection from emergencies such as lack of raw materials and increased demand (Mathuva, 2010; Koumanakos, 2008). The size of inventory held by an institution affects its sales and, ultimately, its profitability (Ching, etal., 2011; Gill et al., 2010; Koumanakos, 2008). Inventory Conversion is calculated as: Inventory/Cost of goods sold × 365.

**Account Payable Period**
Accounts payable is one of the main sources of secured short-term financing. The use of the value of the relationship with the beneficiary is a strong goal that must be emphasized with the same importance of optimal level of prevention. As a result, the strong alliance between the company and its suppliers will strategically improve production lines and enhance the credit record for future expansion (Ikechukwu, 2015). Accounts payable represent companies' reimbursement rates for their suppliers. They are also called suppliers whose invoice for goods or services has yet to be processed. Account Payable Period is calculated as: Average accounts payable/cost of goods sold × 365.

**FINANCIAL PERFORMANCE**

Financial performance is a multidimensional concept whose indexes can be managed, such as those related to production, finance, or marketing (Sohn et al., 2007), or dependency, such as those related to growth and profits (Wolf & Pitt 2006). It can be measured with objective or subjective indicators (Harris, 2005). Measuring financial performance is at the heart of financial management. However, there is no generally accepted definition of business performance because it is a complex and multidimensional being (Kumari & Anthovan, 2017). University researchers have identified and used a wide range of indicators that assess financial performance which are accounting based measures: earnings before interest, tax, depreciation and amortization (EBITDA), pre-interest earnings and taxes (EBIT), return on capital employed (ROCE), return on assets (ROA), return on equity(ROE), earnings per shares (EPS) and invested capital performance (Chang, et al., 2010), market-based measures: company stock dividend and tobin's q ratio (Chatterjee, et al., 2014), and aside the accounting and market-based metrics as major groups of financial performance indicators, researchers apply different metrics for the same company growth as an agent of company performance. These growth measures are intended to reflect the organization's corresponding growth (Carton & Hofer, 2006). Researchers have implemented these measures as a substitute for financial performance, as organizational growth and sales growth in particular are a major driver of corporate economic value (Brealey, et al., 2011). For the purpose of this paper, the study will focus on Tobin's q ratio and return on capital employed which represents a market-base and account-base measures of performance.

**Tobin's Q Ratio**
Tobin's Q is the ratio of the market value of the company's assets as measured by the market value of the outstanding shares and debt (enterprise value) of the replacement cost of the assets of the company (Kasmawati, 2016). The q theory of investment predicts a strong relationship between corporations' market values and their investment rates. The market value of a company divided by its assets' replacement cost is defined as Tobin's Q (Hayes, 2019). Tobin's q ratio is extensively used in the financial literature as a proxy for future investment opportunities. Tobin's q ratio has been used in a variety of situations in the financial literature to examine different financial phenomena and decisions (Singhal, et al., 2016). The ratio has been used in research related to investment and diversification to explain the relationship between managerial ownership and firm value and recently to explain cross-sectional returns

implying that it is also a proxy for risk (Andrei, 2017). Because of its widespread usage in empirical finance, the q ratio may be considered an important variable.

Tobin's Q is a statistical picture that serves as a proxy of the value of the company from an investor's perspective, as in defined described above that Tobin's Q is the market value of a firm's assets and the replacement value to review those assets. Mathematically Tobin's Q can be calculated with the formulation of the following formula: $Q = (MVS + MVD) / RVA$ Where: MVS = Market value of all outstanding stock. MVD = Market value of all debt. RVA = Replacement value of all production capacity.

## Return on Capital Employed

The measure of return on capital employed reflects the efficient utilization of capital resources within the company. Return on capital employed is an important tool for identifying companies that offer good value and have the potential to grow. The return on invested capital can assist in identifying potentially higher income companies. A company with a high return on capital will attract competition and if the entry barriers are not sufficient, the new entrants will enter the industry. Return on capital used is widely used to compare relative profitability, between company divisions and between firms. The literature also shows that the return on capital employed is a common estimator of managerial performance. A high rate of return on capital employed then indicates an operationally profitable and efficiently managed business. Return on capital used compares a company's earnings from its core activities with the capital invested in the business and can be used as a reliable measure of business performance. Since the return on capital employed indicates management's ability to allocate capital effectively, it should be useful as a filter to indicate profitable firms. Return on capital employed is calculated as follows; Return on Capital employed = [Profit after tax + interest] / Net capital employed x 100.

## Theoretical Framework

The study itself is focusing on operating cycle theory Operating cycle theory is one of the most important theories in working capital management. The operating cycle is a measure of working capital management performance. It takes into account debt and equity-linked to working capital. The cycle traditionally starts from receiving raw materials to collecting accounts receivable from debtors on sales of inventory produced from these raw materials. The operating cycle concept is flawed as a measure of cash flow in that it ignores the liquidity needs imposed on the firm due to the time dimension of current liability obligations. Incorporating the time model of the cash flow requirements imposed by the firm's current liabilities is as important for analyzing liquidity as is the evaluation of the time model associated with the cash flows generated by converting its investments into current assets (Richards & Laughlin, 1980). Despite this limitation, it takes into account the accounts receivable and inventories associated with working capital. The cycle traditionally starts from receiving raw materials to collecting accounts receivable from debtors to sell inventories produced from these raw materials. In particular, the incorporation of accounts receivable and inventory turnover measures into the operating cycle concept provides a more appropriate view of liquidity management than relying on current solvency metrics and acid test ratio.

**Empirical Review**

A lot of studies have considered the effect of working capital management of financial performance of several organizations, businesses and industries across the globe. Some of thes studies (Kasahun, 2020; Hassan & Shrivastava, 2019; Al-Abbas, 2018; Prempeh, 2018; Kusuma & Bachtiar, 2018; Korent & Orsags,2018; Jana, 2018; Al-Daleen, 2017; Kalaivani & Jothi, 2017; Prempeh, 2016; Thuraisingam, 2013; Ali & Khan, 2011) were able to identify a positive relationship and effect implying that as working capital management increases, financial performance will increase. However, using the same variables in other sectors and industries (Nguyen, et al., 2020; Nastiti, et al.,2019; Le, 2019; Axiotis, et al., 2018; Wasiuzzaman, 2015; Pais & Gama, 2015; Qureshi, 2014; Iqbal et al., 2014; Ahmed, et al., 2014; Ukaebe, 2014; Eribigen, 2013; Vural, 2012; Al-Debi'e, 201; Bieniasz & Gołaś, 2011; Koperunthevi, 2010) have identified a negative relationship and effect between working capital management and financial performance implying that as working capital management increases, the financial performance decreases. Against the two findings above, studies from Wang, et al. (2020), Oladimeji and Aladejebi (2020), Ulah, et al. (2018) and Hussain, et al. (2017) found no relationship and effect between the two variables implying the choice of one variable does not affect the other.

After several reviews of articles and research, the study found that while there are many studies on working capital management and financial performance worldwide, including Nigeria, no study looked at the entire healthcare sector in Nigeria, but mainly pharmaceutical companies. Also, to the best of the researcher's knowledge, no study in Nigeria has taken both an accounting-based measure and a market-based measure to measure financial performance at the same time in the healthcare sector. There is also a gap in the period this study intends to look at. With this in mind, this study has adopted the entire healthcare sector listed in the Nigerian Stock Exchange fact book to be analysed using least-squares multiple regression. This should provide a more generalized result for the sector.

Against this empirical background, the following null hypotheses were developed to test the effect of working capital management on the financial performance of the listed healthcare firms in Lagos, Nigeria:

$H0_1$- Average collection period has no significant effect on the return on capital employed (ROCE) of the healthcare companies listed in Lagos, Nigeria.
$H0_2$- Average collection period has no significant effect on Tobin's q of the healthcare companies listed in Lagos, Nigeria.
$H0_3$- Inventory conversion period has no significant effect on the return on capital employed (ROCE) of the healthcare companies listed in Lagos, Nigeria.
$H0_4$- Inventory conversion period has no significant effect on Tobin's q of the healthcare companies listed in Lagos, Nigeria.
$H0_5$ - The account payable period has no significant effect on the return on capital employed (ROCE) of the healthcare companies listed in Lagos, Nigeria.
$H0_6$ - The account payable period has no significant effect on Tobin's q of the healthcare companies listed in Lagos, Nigeria.

## 3. METHODOLOGY

The main aim of this research was to determine the effect of working capital management on financial performance of listed healthcare companies (Ekocorp PLC, Union Clinical Diagnostic Services PLC, Morison Industries PLC, Evans Medical PLC, Fidson Healthcare PLC, Glaxo Smithkline Consumer Nigeria PLC, May and Baker Nigeria PLC, Neimeth International Pharmaceuticals PLC, and Parma Deko PLC) in Lagos, Nigeria. The research design adopted for this research is the ex-post facto because it is more concerned with providing a philosophical grounding for deciding what type of knowledge is possible, how to ensure their legitimacy and adequacy and lastly because the data used are secondary data from the Nigerian Exchange Group. This specific research plan is used because the variables in this study can only be measured based on the information provided by the organizations under study. For this study, the dependent variable is the financial performance of the listed health care companies and it is measured using the return on capital employed and Tobin's Q while average collection period, inventory conversion period, and account payable period to measure the independent variable that is working capital management.

**Table 1: Measurement of Variables and priori expectation for the explanatory variable in the model.**

| Variables | How to measure | Abbreviation | Type of Variable |
|---|---|---|---|
| Return on Capital Employed | EBIT/ Total Asset – Current Liabilities | ROCE | Dependent |
| Tobin's Q | Total market value/ total asset | TQ | Dependent |
| Average Collection Period | Account Receivables/Net Sales$\times$ 365 | ACP | Independent |
| Inventory Conversion Period | Inventory/Cost of goods Sold $\times$ 365 | ICP | Independent |
| Account Payable Period | Average accounts payable/cost of goods sold $\times$ 365 | APP | Independent |

**Source: Field Survey, 2022.**

For this study, Vector Error Correction Estimates regression technique was used in running and testing the data collected (accounts receivables period, inventory conversion period, accounts payables period) from the annual financial statements of the ten (10) listed companies. Specifically, the study adopted the panel data analysis to predict the association and effect between the dependent and independent variables. The study also ran the Durbin Watson Statistics test to check for autocorrelation in the time lags.

**Model Specification**

The study applied the following models:

$$FP = f(WCM) \text{ - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 3.1}$$

$$FP = (ROCE \text{ \& } TQ) \text{ - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -3.2}$$

$$ROCE = \beta_0 + \beta_1 ARP + \beta_2 ICP + \beta_3 APP + \beta_4 CS + \mathcal{E} \text{ - - - - - - - - - - 3.3}$$

$$TQ = \beta_0 + \beta_1 ARP + \beta_2 ICP + \beta_3 APP + \beta_4 CS + \mathcal{E} \text{ - - - - - - - - - - - - -3.4}$$

Where:

FP = Financial Performance

WCM = Working Capital Management

ROCE =Return on Capital Employed

TQ =Tobin's Q

$\beta_n$ = Coefficient of nth independent variable

$\mathcal{E}$ = Error Term

ARP = Accounts Receivable Period

ICP = Inventory Conversion Period

APP = Account payable period

CS = Company Size

Based on the explanatory variables in the model, the prior expectations below reflect the propositions concerning the dependent variable.

**RESULTS**

**Table 2: Descriptive Statistics Results**

|  | TOBIN_Q | ROCE | APP | ARP | ICP | FIRM_SIZE |
|---|---|---|---|---|---|---|
| Mean | 0.294000 | -0.030600 | 170.5521 | 229.0103 | 222.6100 | 3.45E+09 |
| Std. Dev. | 0.411275 | 0.796878 | 243.3283 | 225.1622 | 197.1838 | 4.75E+09 |
| Skewness | 2.909804 | -7.999960 | 4.555525 | 3.076135 | 1.267303 | 3.779940 |
| Observations | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Authors' Compilation (2022)

A summary of the statistics used in this study are presented in the table above. As shown in the table, ROCE has the lowest average value of -0.030600 and accounts receivable period (ARP) has the highest average value of 229.0103 while Tobin-q values, accounts payable period (APP) , Inventory conversion period (ICP) and company size are 0.294000, 170.5521, 222.6100 and 3.45E+09 respectively. Standard deviation measures the concentration of data around the mean, therefore, it can be seen from the table provided that the company size data is the largest, while Tobin -q is the lowest, meaning that the values of the run data are far from the mean on average. The measure of of how asymmetric a distribution can be is called skewness. All variables were positively skewed (except for ROCE -7.999960), which means that the distribution block is skewed to the right, i.e. said to be skewed to the left. The implication of this is that skewness tends to say more about whether the mean value of a distribution is above or below the mean. Therefore, a positive skewed value indicates a mean value that is greater than the mean value. Regarding kurtosis, all the variables used have a positive kurtosis value, which means that the distribution is leptokurtic (very high).

**Table 3**

**Unit Root Test**

| VARIABLES | ORDER OF INTEGRATION (LEVELS) | | ORDER OF INTEGRATION (FIRST DIFFERENCE) | |
|---|---|---|---|---|
| | STAT | P-Value | STAT | P-Value |
| ROCE | 46.9714 | 0.0006 | 90.6458 | 0.0000 |
| ARP | 47.8127 | 0.0005 | 92.2132 | 0.0000 |
| APP | 73.2487 | 0.0000 | 173.483 | 0.0000 |
| ICP | 36.1577 | 0.0147 | 142.254 | 0.0000 |
| FIRM SIZE | 31.9536 | 0.0438 | 57.7590 | 0.0000 |

Source: Authors' Compilation (2022)

Before analysis the effect of working capital management and financial performance of listed healthcare firms in Lagos, Nigeria, this study examined the stochastic properties of the series considered in the model by analysing their order of integration on the basis of a series of unit root tests. In general, the unit root tests for non-stationarity (that is, PP - Fisher Chi-square) as shown in the table above fail to reject the null hypothesis of non-stationarity at 5% level for all the variables. However, the null hypothesis is not rejected at 5% significance levels for all the variables both at levels and first-differenced terms. The unit root tests therefore show strong evidence that Tobin q, return on capital employed (ROCE), accounts payable period (APP), account receivable period (ARP), inventory conversion period (ICP) and firm size are non-stationary and are integrated at levels (0) AND order one that is, I(0) for all periods at 5 percent level of significance.

**Vector Error Correction Method for ROCE**
The table below shows the estimation of multiple linear regression involving 12 equation models using VECM regression technique.

**Table 4**
**Vector Error Correction Method for ROCE**

| Error Correction: | D(TOBIN_Q) | D(ICP) | D(ARP) | D(APP) | D(FIRM_SIZE) |
|---|---|---|---|---|---|
| | -0.698067 | 135.4784 | 29.36569 | 573.1821 | 5.16E+09 |
| | (0.20978) | (99.7663) | (119.294) | (103.217) | (1.4E+09) |
| CointEq1 | [-3.32765] | [ 1.35796] | [ 0.24616] | [ 5.55315] | [ 3.62143] |
| | -0.193418 | -142.1362 | -80.24215 | -445.7966 | -6.26E+09 |
| | (0.19652) | (93.4608) | (111.755) | (96.6938) | (1.3E+09) |
| D(TOBIN_Q(-1)) | [-0.98422] | [-1.52081] | [-0.71802] | [-4.61040] | [-4.69303] |
| | 0.003879 | -8.883862 | -37.23938 | -82.94620 | -4.61E+09 |
| | (0.16214) | (77.1107) | (92.2043) | (79.7782) | (1.1E+09) |
| D(TOBIN_Q(-2)) | [ 0.02392] | [-0.11521] | [-0.40388] | [-1.03971] | [-4.18797] |
| | -0.000251 | -0.656950 | 0.077013 | -0.279259 | 3954386. |
| | (0.00033) | (0.15513) | (0.18550) | (0.16050) | (2215010) |
| D(ICP(-1)) | [-0.76988] | [-4.23480] | [ 0.41517] | [-1.73996] | [ 1.78527] |
| | -8.93E-05 | -0.065898 | 0.167035 | 0.278782 | 1009926. |
| D(ICP(-2)) | (0.00034) | (0.16252) | (0.19434) | (0.16815) | (2320556) |

| | [-0.26131] | [-0.40547] | [ 0.85952] | [ 1.65798] | [ 0.43521] |
|---|---|---|---|---|---|
| | 0.000937 | -0.430536 | -1.045996 | -1.065692 | -7917155. |
| | (0.00056) | (0.26461) | (0.31640) | (0.27376) | (3778173) |
| D(ARP(-1)) | [ 1.68419] | [-1.62706] | [-3.30589] | [-3.89275] | [-2.09550] |
| | 0.001055 | -0.127367 | -0.233157 | -0.967950 | -1554312. |
| | (0.00052) | (0.24633) | (0.29455) | (0.25485) | (3517223) |
| D(ARP(-2)) | [ 2.03758] | [-0.51705] | [-0.79157] | [-3.79804] | [-0.44191] |
| | -0.000885 | 0.083741 | -0.067663 | -0.045829 | 3152338. |
| | (0.00031) | (0.14848) | (0.17754) | (0.15361) | (2119981) |
| D(APP(-1)) | [-2.83548] | [ 0.56401] | [-0.38112] | [-0.29834] | [ 1.48697] |
| | -0.000796 | -0.144660 | -0.134158 | -0.368447 | 3351579. |
| | (0.00031) | (0.14625) | (0.17488) | (0.15131) | (2088237) |
| D(APP(-2)) | [-2.58870] | [-0.98911] | [-0.76714] | [-2.43502] | [ 1.60498] |
| | -1.95E-11 | 1.32E-09 | 2.56E-09 | 2.82E-08 | -0.077707 |
| | (1.7E-11) | (8.3E-09) | (9.9E-09) | (8.6E-09) | (0.11869) |
| D(FIRM_SIZE(-1)) | [-1.11695] | [ 0.15924] | [ 0.25721] | [ 3.27584] | [-0.65473] |
| | 1.44E-12 | 1.37E-09 | -3.33E-09 | 1.14E-08 | 0.023204 |
| | (1.2E-11) | (5.6E-09) | (6.7E-09) | (5.8E-09) | (0.08057) |
| D(FIRM_SIZE(-2)) | [ 0.12133] | [ 0.24302] | [-0.49338] | [ 1.94694] | [ 0.28801] |
| | 0.006344 | -11.46594 | 38.26633 | 7.551934 | -1.24E+09 |
| | (0.06501) | (30.9164) | (36.9680) | (31.9859) | (4.4E+08) |
| C | [ 0.09759] | [-0.37087] | [ 1.03512] | [ 0.23610] | [-2.81024] |

Source: Authors' Compilation (2022)

In the models, it was observed that the p-values are not showed, so the study went further to calculate a system equation from the VEC model in order to determine the level of significance among all the variables in the table below:

**Table 5**

| Model Equations | Variables | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|---|
| ROCE | C(2) | -0.582478 | 0.157141 | -3.706722 | 0.0003 |
| | C(3) | -0.391043 | 0.169041 | -2.313306 | 0.0214 |
| ICP | C(13) | -37.29600 | 14.91226 | -2.501030 | 0.0129 |
| | C(14) | 63.61040 | 29.70595 | 2.141336 | 0.0331 |
| | C(16) | -0.591592 | 0.163472 | -3.618920 | 0.0003 |
| APP | C(25) | -37.71272 | 19.09444 | -1.975063 | 0.0492 |
| | C(30) | -0.419912 | 0.187624 | -2.238050 | 0.0260 |
| | C(31) | -0.485072 | 0.189956 | -2.553604 | 0.0112 |
| ARP | C(37) | -453.6524 | 56.36518 | -8.048451 | 0.0000 |
| | C(38) | 485.3544 | 112.2822 | 4.322630 | 0.0000 |
| | C(39) | 411.0932 | 120.7850 | 3.403513 | 0.0008 |
| | C(42) | 2.305854 | 0.553850 | 4.163320 | 0.0000 |
| | C(43) | 1.271795 | 0.560734 | 2.268091 | 0.0241 |
| | C(44) | -2.476087 | 0.713453 | -3.470568 | 0.0006 |
| | C(45) | -2.076225 | 0.827245 | -2.509805 | 0.0126 |
| | C(46) | 1.79E-07 | 2.89E-08 | 6.187450 | 0.0000 |
| | C(47) | 1.14E-07 | 2.06E-08 | 5.531781 | 0.0000 |
| FIRM SIZE | C(49) | -1.05E+09 | 2.21E+08 | -4.742690 | 0.0000 |

| C(50) | 1.12E+09 | 4.39E+08 | 2.553657 | 0.0112 |
|---|---|---|---|---|
| C(51) | 9.67E+08 | 4.73E+08 | 2.046266 | 0.0416 |
| C(54) | 7012227. | 2166732. | 3.236315 | 0.0014 |
| C(55) | 5910113. | 2193663. | 2.694176 | 0.0075 |

Source: Authors' Compilation (2022)

From the table above, the system of equations is establishing the strong determinant nature of return on capital employed being inventory conversion period, account payable period, account receivable period and firm size. The finding strongly established a significant relationship between return on capital employed and all the independent variables in the five variables as obtained from the Vector Error Correction Model technique. Furthermore, ROCE is establishing a negative and significant relation with equations C(2) and C(3) with coefficients at -0.582478 and -0.391043 respectively. Subsequently, ICP also established a significantly negative relationship with C(13) and C(16) at -37.29600 and -0.591592 respectively while C(14) is positively significant at 63.61040. APP established a significantly negative relationship with equations C(25), C(30) and C(31) with coefficients at -37.71272, -0.419912 and -0.485072 respectively. Also, ARP established both negative and positively significant relationships with C(37) at -453.6524, C(38) at 485.3544, C(39) at 411.0932, C(42) at 2.305854, C(43) at 1.271795 , C(44) at -2.476087, C(45) at -2.076225, C(46) at 1.79E-07 and C(47) at 1.14E-07. Furthermore, firm size established a negative and significant relationship at C(49) with coefficient at -1.05E+09 and positive correlations at C(50), C(51), C(54) and C(55) with coefficients at 1.12E+09, 9.67E+08, 7012227 and 5910113 respectively.

The table below shows the estimation of multiple linear regression involving 12 equation models using VECM regression technique:

**Table 6**

| Error Correction: | D(TOBIN_Q) | D(ICP) | D(APP) | D(ARP) | D(FIRM_SIZE) |
|---|---|---|---|---|---|
| | -0.698067 | 135.4784 | 573.1821 | 29.36569 | 5.16E+09 |
| | (0.20978) | (99.7663) | (103.217) | (119.294) | (1.4E+09) |
| CointEq1 | [-3.32765] | [ 1.35796] | [ 5.55315] | [ 0.24616] | [ 3.62143] |
| | -0.193418 | -142.1362 | -445.7966 | -80.24215 | -6.26E+09 |
| | (0.19652) | (93.4608) | (96.6938) | (111.755) | (1.3E+09) |
| D(TOBIN_Q(-1)) | [-0.98422] | [-1.52081] | [-4.61040] | [-0.71802] | [-4.69303] |
| | 0.003879 | -8.883862 | -82.94620 | -37.23938 | -4.61E+09 |
| | (0.16214) | (77.1107) | (79.7782) | (92.2043) | (1.1E+09) |
| D(TOBIN_Q(-2)) | [ 0.02392] | [-0.11521] | [-1.03971] | [-0.40388] | [-4.18797] |
| | -0.000251 | -0.656950 | -0.279259 | 0.077013 | 3954386. |
| | (0.00033) | (0.15513) | (0.16050) | (0.18550) | (2215010) |
| D(ICP(-1)) | [-0.76988] | [-4.23480] | [-1.73996] | [ 0.41517] | [ 1.78527] |
| | -8.93E-05 | -0.065898 | 0.278782 | 0.167035 | 1009926. |
| D(ICP(-2)) | (0.00034) | (0.16252) | (0.16815) | (0.19434) | (2320556) |

| | | | | | |
|---|---|---|---|---|---|
| | [-0.26131] | [-0.40547] | [ 1.65798] | [ 0.85952] | [ 0.43521] |
| | -0.000885 | 0.083741 | -0.045829 | -0.067663 | 3152338. |
| | (0.00031) | (0.14848) | (0.15361) | (0.17754) | (2119981) |
| D(APP(-1)) | [-2.83548] | [ 0.56401] | [-0.29834] | [-0.38112] | [ 1.48697] |
| | -0.000796 | -0.144660 | -0.368447 | -0.134158 | 3351579. |
| | (0.00031) | (0.14625) | (0.15131) | (0.17488) | (2088237) |
| | [-2.58870] | [-0.98911] | [-2.43502] | [-0.76714] | [ 1.60498] |
| | (0.00056) | (0.26461) | (0.27376) | (0.31640) | (3778173) |
| D(APP(-2)) | [ 1.68419] | [-1.62706] | [-3.89275] | [-3.30589] | [-2.09550] |
| | 0.001055 | -0.127367 | -0.967950 | -0.233157 | -1554312. |
| | (0.00052) | (0.24633) | (0.25485) | (0.29455) | (3517223) |
| D(ARP(-2)) | [ 2.03758] | [-0.51705] | [-3.79804] | [-0.79157] | [-0.44191] |
| | -1.95E-11 | 1.32E-09 | 2.82E-08 | 2.56E-09 | -0.077707 |
| | (1.7E-11) | (8.3E-09) | (8.6E-09) | (9.9E-09) | (0.11869) |
| D(FIRM_SIZE(-1)) | [-1.11695] | [ 0.15924] | [ 3.27584] | [ 0.25721] | [-0.65473] |
| | 1.44E-12 | 1.37E-09 | 1.14E-08 | -3.33E-09 | 0.023204 |
| | (1.2E-11) | (5.6E-09) | (5.8E-09) | (6.7E-09) | (0.08057) |
| D(FIRM_SIZE(-2)) | [ 0.12133] | [ 0.24302] | [ 1.94694] | [-0.49338] | [ 0.28801] |
| | 0.006344 | -11.46594 | 7.551934 | 38.26633 | -1.24E+09 |
| C | (0.06501) | (30.9164) | (31.9859) | (36.9680) | (4.4E+08) |

Source: Authors' Compilation (2022)

In the models, it was observed that the p-values are not showed, so the study went further to calculate a system equation from the VEC model in order to determine the level of significance among all the variables in the table below:

**Table 7**

| Model Equations | Systems Equation | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|---|
| TOBIN Q | C(1) | -0.698066 | 0.209778 | -3.327644 | 0.0010 |
| | C(6) | -0.000885 | 0.000312 | -2.835483 | 0.0049 |
| | C(7) | -0.000796 | 0.000308 | -2.588697 | 0.0101 |
| | C(9) | 0.001055 | 0.000518 | 2.037581 | 0.0425 |
| ICP | C(16) | -0.656950 | 0.155131 | -4.234803 | 0.0000 |
| APP | C(25) | 573.1824 | 103.2174 | 5.553157 | 0.0000 |
| | C(26) | -445.7968 | 96.69377 | -4.610398 | 0.0000 |
| | C(31) | -0.368447 | 0.151312 | -2.435021 | 0.0155 |
| | C(32) | -1.065693 | 0.273763 | -3.892758 | 0.0001 |
| | C(33) | -0.967951 | 0.254855 | -3.798049 | 0.0002 |
| | C(34) | 2.82E-08 | 8.60E-09 | 3.275846 | 0.0012 |
| ARP | C(46) | -5.96E-08 | 1.52E-08 | -3.931845 | 0.0001 |
| | C(47) | -2.24E-08 | 1.03E-08 | -2.172082 | 0.0307 |
| FIRM SIZE | C(49) | 5.16E+09 | 1.42E+09 | 3.621431 | 0.0003 |
| | C(50) | -6.26E+09 | 1.33E+09 | -4.693033 | 0.0000 |

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|  | C(51) | -4.61E+09 | 1.10E+09 | -4.187966 | 0.0000 |
|---|---|---|---|---|---|
|  | C(56) | -7917155. | 3778173. | -2.095498 | 0.0370 |
|  | C(58) | -0.077707 | 0.118685 | -0.654731 | 0.5132 |
|  | C(60) | -1.24E+09 | 4.41E+08 | -2.810238 | 0.0053 |

Source: Authors' Compilation (2022)

From the table above, the system of equations is establishing the strong determinant nature of return on capital employed being inventory conversion period, account payable period, account receivable period and firm size. The finding strongly established a significant relationship between return on capital employed and all the independent variables in the five variables as obtained from the Vector Error Correction Model technique. Furthermore, ROCE is establishing a negative and significant relation with equations C(1), C(6), and C(7) with coefficients at -0.698066, -0.000885, and -0.000796 respectively while C(9) established a positive and significant at 0.001055. Subsequently, ICP also established a significantly negative relationship with C(16) at -0.656950. APP established a significantly negative relationship with equations C(26), C(31), C(32), and C(33) with coefficients at -445.7968, -0.368447, -1.065693, -0.967951, respectively while C(25) and C(34) showed a positive and significant relationship with coefficients at 573.1824, and 2.82E-08 respectively. For ARP, only negative and significant relationships were established with C(46) at -5.96E-08 and C(47) at -2.24E-08. Furthermore, firm size established a negative and significant relationship at C(50) with coefficient at -6.26E+09, C(51) with coefficient at -4.61E+09, C(56) with coeeficient at -7917155, C(58) with -0.077707 and C(60) at -1.24E+09 while only C(49) showed a significant and positive relationship with coefficient at 5.16E+09.

**CONCLUSION**

Conclusively, the main objective of this research was to investigate the effect of working capital management on the performance of listed healthcare companies Lagos, Nigeria. To investigate this objective, we conducted several statistical tests using the VECM. We collected the needed data from the firm's annual reports which helped in computing the measures of working capital management and financial performance. To enable us to answer the main research question, several sub-questions were developed which was analysed statistically with the use of hypotheses. These analyses gave evidence of a direct relationship between the working capital management measures and the measure of financial performance we used. Below we present short answers to first the specific objectives and main objective:
First, to determine the effect of the average collection period on the return of capital employed of listed healthcare companies, the study revealed that the average collection period and capital employed of listed healthcare firms are positively related meaning that, as the average collection period increases, so does return on capital employed. Therefore, the alternate hypothesis which states that there is a significant positive relationship between the average collection period and returns on capital employed of listed healthcare firm is accepted and reject the null hypothesis.

Second, to determine the effect of the average collection period on the Tobin's Q of listed healthcare companies, the study revealed that the average collection period and Tobin's Q of

listed healthcare firms are positively related which implies that, as the average collection period increases, the Tobin's Q also increases. Therefore, the alternate hypothesis which states that there is a significant positive relationship between the average collection period and Tobin's Q of listed healthcare firm is accepted and the null hypothesis is rejected.

Third, to determine the effect of the inventory conversion period on the return of capital employed of listed healthcare companies, the study revealed that the inventory conversion period and capital employed of listed healthcare firms are positively related meaning that, as the inventory conversion period increases, so does return on capital employed. Therefore, the alternate hypothesis which states that there is a significant relationship between inventory conversion period and returns on capital employed of listed healthcare firm is accepted and the null hypothesis is rejected.

Fourth, to determine the effect of the inventory conversion period on the Tobin's Q of listed healthcare companies, the study revealed that the inventory conversion period and Tobin's Q of listed healthcare firms are positively related which implies that, as the inventory conversion period increases, the Tobin's Q also increases. Therefore, the alternate hypothesis which states that there is a significant positive relationship between inventory conversion period and Tobin's Q of listed healthcare firm is accepted and the null hypothesis was rejected.

Fifth, to investigate the impact of creditors payment period on the return on capital employed of the health care companies listed in Nigeria, the analysis shows that creditors payment period has a negative effect on the return on capital employed of listed healthcare companies in Nigeria. This implies that, as the accounts payable period increases, the return on capital employed decreases. This shows that we accept the alternate hypothesis which states that there is a significant negative relationship between the account payable period and returns on capital employed.

Six, to investigate the effect of creditors payment period on the Tobin's Q of the listed healthcare companies, the study ascertains that the account payable period and Tobin's Q are inversely related, meaning that as creditors payment period increases, Tobin's Q decreases. Therefore, we accept the alternated hypothesis that shows a relationship between the account payable period and Tobin's Q and reject the null hypothesis. Lastly, the main objective is to investigate the effect of working capital management on the financial performance of listed healthcare companies using average collection period, inventory conversion period and creditors payment period as measures for working capital management and return on capital employed and Tobin's Q ratio as measures of financial performance revealed both negative and positive effect. This concludes that working capital management significantly affects the financial performance of listed healthcare companies in Nigeria.

To this end, 10 listed healthcare companies' financials were used to analyze the effect of working capital on financial performance which revealed both a positive and negative effect and correlation. This evidence shows that managing working capital effectively is an important aspect of ensuring or achieving the best financial performance in organizations. For financial managers, these findings can give them a better view of the fact that there might be no clear

and best way of managing working capital. It is something that can be different from firm to firm so they might have to analyze their situation or the phenomenon within their organization and between different departments to find what might be the optimal level for their firm.

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